ASSIGNMENT 6

Textbook Assignment: "Basics of Time (continued)," and "Introduction to Celestial Navigation," chapters 5 and 6, pages 5-8 through 6-9.

6-1. How much time is equivalent to 1° of arc?

1. 15 min
2. 15 set
3. 4 min
4. 4 set

6-2. What is the arc equivalent of 1 minute of time?

1. 1' of arc
2. 4' of arc
3. 15" of arc
4. 15' of arc

6-3. What is the arc equivalent of 1 second of time?

1. 4" of arc
2. 4' of arc
3. 15" of arc
4. 15' of arc

6-4. In the time-to-arc conversion process, to obtain degrees the hours should be multiplied by what number?

1. 5
2. 10
3. 15
4. 20

6-5. What is the equivalent in arc to $8^h26^m46^s$ in time?

1. 120°36'40"
2. 124°50'40"
3. 126°41'30"
4. 127°10'00"

	°	'	"
5^h	(A)	0	0
9^m	2	(B)	0
12^s	0	3	(C)

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Figure 6-A

IN ANSWERING QUESTIONS 6-6 THROUGH 6-8, REFER TO FIGURE 6-A. FIGURE 6-A IS A TIME-TO-ARC CONVERSION CHART.

6-6. What number should you put in blank (A)?

1. 15
2. 75
3. 150
4. 300

6-7. What number should you put in blank (B)?

1. 9
2. 2
3. 15
4. 4

6-8. What number should you put in blank (C)?

1. 0
2. 15
3. 3
4. 4

6-9. When converting arc to time, the degrees should be divided by 15 to obtain hours.

1. True
2. False

6-10. To find the ZD for a given position, the first step is to divide the longitude of the position by 15°.

1. True
2. False

6-11. What is the ZD time equivalent of 25° of arc

1. 2^h0^m
2. 1^h50^m
3. 1^h40^m
4. 1^h30^m

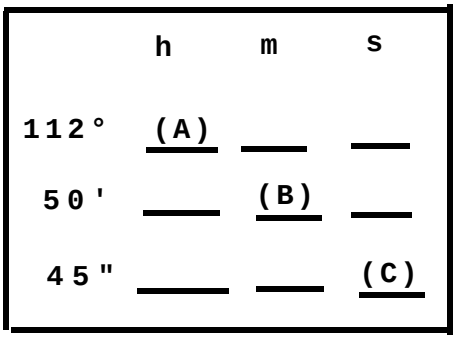

Figure 6-B

IN ANSWERING QUESTION 6-12 THROUGH 6-14, REFER TO FIGURE 6-B. FIGURE 6-B IS AN ARC-TO-TIME CONVERSION CHART.

6-12. What number should you put in blank (A)?

1. 1
2. 7
3. 3
4. 28

6-13. What number should you put in blank (B)?

1. 1
2. 7
3. 3
4. 28

6-14. What number should you put in blank (C)?

1. 1
2. 7
3. 3
4. 28

6-15. What is the time equivalent of 111°44'45" of arc?

1. $7^h20^m8^s$
2. $7^h24^m14^s$
3. $7^h26^m59^s$
4. $7^h34^m24^s$

6-16. What is the time equivalent of an arc measuring 50°32'30"?

1. $3^h20^m\ 8^s$
2. $3^h22^m10^s$
3. $4^h\ 2^m\ 2^s$
4. $4^h10^m4^s$

6-17. Which of the following relations holds true in time zones west of Greenwich?

1. The ZD is plus and is added to GMT to get ZT
2. The ZD is plus and is added to ZT to get GMT
3. The ZD is minus and is added to GMT to get ZT
4. The ZD is minus and is added to ZT to get GMT

6-18. What is the numerical value of GMT if ZT is $10^h40^m10^s$ at 89°36'17" longitude?

1. $4^h40^m10^s$
2. $5^h40^m10^s$
3. $15^h40^m10^s$
4. $16^h40^m10^s$

6-19. What is GMT at 83°W longitude if zone time is $12^h18^m4^s$?

1. $6^h18^m4^s$
2. $7^h18^m4^s$
3. $17^h18^m4^s$
4. $18^h18^m4^s$

6-20. When figuring for GMT, a correctton of how many hours should be applied to ZT at 172°E longitude?

1. Plus 10
2. Minus 10
3. Plus 11
4. Minus 11

6-21. What is GMT at 18°E longitude if zone time is $15^h27^m14^s$?

1. $0^h27^m14^s$
2. $1^h27^m14^s$
3. $14^h27^m14^s$
4. $16^h27^m14^s$

A correction of how many hours should be applied to GMT to compute zone time at 158°W longitude?

1. Plus 10
2. Minus 10
3. Plus 11
4. Minus 11

6-23. When you convert GMT to ZT, which of the following relations holds true in time zones east of Greenwich?

1. The ZD is plus and is added to GMT to get ZT
2. The ZD is minus and is subtracted from GMT to get ZT
3. The ZD is plus and is subtracted from GMT to get ZT
4. The ZD is minus and is added to GMT to get ZT

6-24. What is the numerical value of ZT if GMT is $5^h15^m25^s$ at 117°30'45"E longitude?

1. $21^h15^m25^s$
2. $22^h15^m25^s$
3. $12^h15^m25^s$
4. $13^h15^m25^s$

6-25. What is the numerical value of ZT if GMT is $23^h17^m14^s$ at 127°31'00"W longitude?

1. $14^h17^m14^s$
2. $15^h17^m14^s$
3. $07^h17^m14^s$
4. $08^h17^m14^s$

6-26. When traveling towards the west and you enter a new time zone, the clocks must be retarded 1 hour.

1. True
2. False

6-27. When, if ever, should you advance the ship's chronometers?

1. When traveling west into a new time zone
2. When traveling east into a new time zone
3. When the commanding officer tells you
4. Never

6-28. Which reference line, if any, is the 180th meridian?

1. International Date line
2. Greenwich Meridian
3. Equator

6-29. When you cross the International Dateline, which of the following rules is correct for adjusting time?

1. Traveling east retard 1 day
2. Traveling west retard 1 day
3. Traveling east retard 12 hours
4. Traveling west retard 12 hours

IN ANSWERING QUESTIONS 6-30 AND 6-31. SELECT FROM COLUMN B THE DEFINITION THAT MATCHES THE CHRONOMETER DIFFERENCE IN COLUMN A. NOT ALL RESPONSES ARE USED.

	A. CHRONOMETER DIFFERENCE	B. DEFINITION
6-30.	Chronometer error	1. The difference between the chronometer time and local time
6-31.	Chronometer rate	2. The difference between GMT and chronometer time
		3. The difference a chronometer loses or gains in a specific time period

6-32. Which publication number gives a listing of time ticks?

1. No. 102
2. No. 110
3. No. 116
4. No. 117

6-33. What time scale contributes to the UTC and GMT differing by up to .7 seconds?

1. Geographic
2. Gnomonic
3. Atomic
4. Atmospheric

6-34. Which of the following formulas should be used to compute correct time?

1. GMT = UTC - DUT
2. GMT = UTC + DUT
3. UTC = GMT - DUT
4. UTC = GMT + DUT

6-35. Which of the following call letters is NOT a radio station?

1. WWV
2. WWVH
3. DUT
4. CHU

6-36. Each page of the Navigational Timepiece Rate Book can accommodate the records of (a) how many chronometers and (b) for what time period?

1. (a) One (b) 3 mo
2. (a) Three (b) 3 mo
3. (a) One (b) 1 mo
4. (a) Three (b) 1 mo

6-37. If the comparing watch reads $12^h28^m00^s$ GMT when the chronometer reads $12^h26^m01^s$, what is the chronometer error?

1. 1^m58^s
2. 1^m59^s
3. 2^m00^s
4. 2^m01^s

6-38. What is the average daily rate (ADR) of a chronometer that is fast by 5 minutes 31 seconds on 1 September 1994 and fast by 6 minutes 43 seconds on 30 September 1994?

1. -13.43 s/day
2. +11.03 s/day
3. +2.4 s/day
4. -2.4 s/day

6-39. What is the ADR of a chronometer that is slow by 11 minutes 58 seconds on 1 July 1994 and slow by 10 minutes 59 seconds 31 July 1994?

1. -1.96 s/day
2. +1.96 s/day
3. -1.90 s/day
4. +1.90 s/day

6-40. What is the ADR of a chronometer that is slow by 2 minutes la seconds on 1 April 1994 and slow by 4 minutes 15 seconds on 22 April 1994?

1. +5.31 s/day
2. -5.31 s/day
3. +5.37 s/day
4. -5.57 s/day

6-41. What is the ADR of a chronometer that is fast by 2 minutes 48 seconds on 17 February 1994 and slow by 0 minutes 48 seconds on 17 March 1994?

1. +7.2 s/day
2. -7.2 s/day
3. +7.4 s/day
4. -7.4 s/day

6-42. Chronometer error should be determined no closer than which of the following time periods?

1. 1 sec
2. 2 sec
3. 3 sec
4. 1/2 sec

6-43. Which of the following types of timepieces is used to time celestial observations?

1. Chronometer
2. Deck clock
3. Comparing watch
4. General-purpose clock

6-44. What time is used in celestial observations?

1. Local
2. Meridian
3. Zone
4. Greenwich mean

6-45. When should you try to make C-W comparisons to obtain the most accurately timed observations?

1. Every 10 days
2. Both before and after sights
3. At least once a watch
4. Every day at 1130

6-46. The chronometer time of a celestial observation is obtained by adding C-W to which of the following times?

1. GMT
2. WT
3. LMT
4. ZT

6-47. GMT is obtained by applying a CE correction to which of the following times?

1. CT
2. ZT
3. LMT
4. LAT

6-48. If the comparing watch reads $3^h20^m10^s$ when the chronometer reads 5h10m00s, what is the value of C-W?

1. $8^h30^m10^s$
2. $2^h10^m10^s$
3. $1^h49^m50^s$
4. $1^h10^m10^s$

6-49. For purposes of celestial navigation, the Earth is considered to be which of the following shapes?

1. Prolate spheroid
2. Cylinder
3. Sphere
4. Paraboloid

6-50. What is another name for the celestial equator?

1. The equinoctial equator
2. The vernal equinox
3. The celestial meridian
4. The Tropic of Cancer

6-51. What is the name of a horizontal line in the system of coordinates used in locating objects on the celestial sphere?

1. Greenwich hour angle
2. Declination
3. Longitude
4. Latitude

6-52. How many degrees per hour does the hour circle of a body move?

1. 10
2. 50
3. 150
4. 240

6-53. As a celestial body moves westward, what will happen to the value of its GHA?

1. Remain approximately constant
2. Increase to 360°
3. Decrease to 0°
4. Increase to 180° and then decrease

6-54. What is the name of a vertical line in the system of coordinates used in locating objects on the celestial sphere?

1. Hour circles
2. Latitude
3. Parallel
4. Longitude

6-55. In what direction(s) from Greenwich, is the GHA of a body measured?

1. West only
2. East only
3. East or West
4. North

6-56. What is the celestial reference point used to calculate sidereal hour angle?

1. Sun
2. Autumnal equinox
3. Moon
4. First point of Aries

IN ANSWERING QUESTIONS 6-57 THROUGH 6-60, SELECT THE DESCRIPTION FROM COLUMN B THAT MATCHES THE TERM IN COLUMN A. RESPONSES ARE USED ONLY ONCE.

	A. TERM	B. DESCRIPTION
6-57.	Celestial equator	1. Measured westward from 0° through 360° from the observer's meridian
6-58.	First point of Aries	2. The point of reference for measuring declination
6-59.	Hour Circle	3. The reference point for measuring angles for stars and planets
6-60.	Local Hour Angle (LHA)	4. Great circles that encircle the celestial sphere in the same manner as meridians

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6-61. Which of the following facts is NOT true of the celestial coordinate system?

1. Celestial bodies are in constant motion
2. The GHA of Aries will align Aries with the Greenwich Meridian
3. The LHA associates all hour circles of any celestial body with the Greenwich Meridian on Earth
4. Aries is the starting point for all celestial observations

6-62. What is the period of time between data that is presented in the Nautical Almanac?

1. Every day
2. Every other day
3. Every third day
4. Every fifth day

6-63. Which of the following information is contained in the right-hand pages of the Nautical Almanac?

1. GHA, declination, and meridian passage of Sun
2. GHA, and declination for Aries
3. GHA, declination for Venus, Moonrise, and Moonset
4. GHA for Venus, Aries, Mars, Jupiter, and Saturn

6-64. A total of how many navigational stars are listed in the Nautical Almanac?

1. 54
2. 57
3. 59
4. 63

6-65. What information is presented in the extreme left-hand column of each page of the Nautical Almanac?

1. Hours (LMT)
2. Date (LMT)
3. Date and time at Greenwich
4. Hours at Standard Meridian

Lat.	Twilight Naut.	Twilight Civil	Sunrise	Moonrise 25	Moonrise 26	Moonrise 27	Moonrise 28
°	h m	h m	h m	h m	h m	h m	h m
N 72	05 39	06 59	08 18	□	□	□	□
N 70	05 38	06 50	07 59	□	□	□	□
68	05 37	06 43	07 44	□	□	□	□
66	05 36	06 36	07 32	16 09	□	□	18 35
64	05 35	06 31	07 21	16 54	17 08	17 59	19 38
62	05 34	06 26	07 13	17 23	17 51	18 46	20 12
60	05 33	06 21	07 05	17 46	18 20	19 17	20 37
N 58	05 32	06 18	06 59	18 04	18 42	19 40	20 57
56	05 31	06 14	06 53	18 20	19 01	19 58	21 13
54	05 30	06 11	06 48	18 33	19 16	20 14	21 27
52	05 29	06 08	06 43	18 45	19 29	20 28	21 39
50	05 27	06 05	06 39	18 55	19 41	20 40	21 50
45	05 25	05 59	06 29	19 17	20 05	21 04	22 13
N 40	05 22	05 54	06 22	19 35	20 25	21 24	22 31
35	05 19	05 49	06 15	19 50	20 41	21 40	22 46
30	05 16	05 44	06 09	20 02	20 55	21 55	22 59
20	05 10	05 36	05 59	20 25	21 19	22 19	23 21
N 10	05 03	05 28	05 49	20 44	21 40	22 40	23 41
0	04 55	05 19	05 41	21 02	22 00	22 59	23 59
S 10	04 45	05 10	05 32	21 20	22 20	23 19	24 17
20	04 33	05 00	05 22	21 40	22 41	23 40	24 36
30	04 17	04 46	05 11	22 03	23 05	24 04	00 04
35	04 07	04 38	05 05	22 16	23 19	24 18	00 18
40	03 55	04 29	04 58	22 31	23 36	24 35	00 35
45	03 39	04 18	04 49	22 50	23 56	24 54	00 54
S 50	03 20	04 04	04 39	23 13	24 21	00 21	01 19
52	03 10	03 57	04 34	23 24	24 33	00 33	01 31
54	02 59	03 49	04 29	23 36	24 47	00 47	01 44
56	02 46	03 41	04 23	23 51	25 03	01 03	02 00
58	02 31	03 31	04 16	24 08	00 08	01 22	02 18
S 60	02 12	03 20	04 08	24 29	00 29	01 46	02 41

Lat.	Twilight Naut.	Twilight Civil	Sunrise	Moonrise 25	Moonrise 26	Moonrise 27	Moonrise 28
°	h m	h m	h m	h m	h m	h m	h m
N 72	15 09	16 27	17 47	□	□	□	□
N 70	15 28	16 36	17 48	□	□	□	□
68	15 43	16 44	17 49	□	□	□	□
66	15 55	16 51	17 51	13 16	□	□	16 59
64	16 05	16 56	17 52	12 32	14 17	15 30	15 56
62	16 14	17 01	17 53	12 03	13 34	14 43	15 21
60	16 22	17 06	17 54	11 41	13 06	14 12	14 56
N 58	16 28	17 09	17 55	11 23	12 44	13 49	14 36
56	16 34	17 13	17 56	11 08	12 26	13 30	14 19
54	16 40	17 16	17 58	10 55	12 10	13 15	14 04
52	16 44	17 19	17 59	10 44	11 57	13 01	13 52
50	16 49	17 22	18 00	10 34	11 46	12 49	13 41
45	16 58	17 28	18 03	10 13	11 22	12 24	13 18
N 40	17 06	17 34	18 05	09 56	11 02	12 04	12 59
35	17 13	17 39	18 08	09 42	10 46	11 48	12 44
30	17 19	17 43	18 11	09 29	10 33	11 33	12 30
20	17 29	17 52	18 18	09 08	10 09	11 09	12 07
N 10	17 39	18 00	18 25	08 50	09 48	10 48	11 47
0	17 47	18 09	18 33	08 33	09 29	10 28	11 28
S 10	17 56	18 18	18 43	08 16	09 10	10 08	11 09
20	18 06	18 29	18 55	07 58	08 50	09 47	10 48
30	18 17	18 42	19 12	07 37	08 27	09 23	10 25
35	18 24	18 50	19 22	07 25	08 13	09 08	10 11
40	18 31	19 00	19 34	07 11	07 57	08 51	09 55
45	18 40	19 11	19 50	06 55	07 38	08 31	09 35
S 50	18 50	19 26	20 10	06 35	07 14	08 06	09 11
52	18 55	19 33	20 20	06 25	07 03	07 54	08 59
54	19 01	19 40	20 31	06 14	06 50	07 40	08 46
56	19 07	19 49	20 44	06 02	06 35	07 24	08 31
58	19 14	19 59	21 00	05 48	06 18	07 05	08 12
S 60	19 21	20 11	21 20	05 32	05 57	06 41	07 50

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer Pass.	MOON Mer Pass Upper	MOON Mer Pass Lower	MOON Age	MOON Phase
	m s	m s	h m	h m	h m	d	
25	15 48	15 52	11 44	02 20	14 48	19	
26	15 55	15 59	11 44	03 16	15 45	20	◑
27	16 02	16 05	11 44	04 14	16 44	21	

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Figure 6-C

IN ANSWERING QUESTIONS 6-66 THROUGH 6-71, REFER TO FIGURE 6-C.

6-66. How often are *v* and *d* values tabulated for the moon?

1. Hourly
2. Daily
3. Every third day
4. Every fifth day

6-67. What time is sunrise at 28°N latitude?

1. 0601
2. 0603
3. 0607
4. 0608

6-68. What is the time of sunrise at 15°S latitude, and 61°E longitude?

1. 1756
2. 1757
3. 1801
4. 1805

6-69. What is the time of sunset at 3°S latitude?

1. 1747
2. 1749
3. 1748
4. 1750

6-70. What is the time of Sunset at 61°N latitude, and 77°30'W longitude?

1. 1608
2. 1618
3. 1623
4. 1628

6-71. What is the time of civil evening twilight at latitude 32°N, and longitude 62°E?

1. 1810
2. 1802
3. 1749
4. 1741

6-72. On the left page of the Nautical Almanac, a single entry is given for *v* and *d* values for which of the following periods?

1. Hourly
2. Daily
3. Every third day
4. Every fifth day

6-73. The declination of any navigational star can be found for any day of the year in which of the following publications?

1. Nautical Almanac
2. Pub. No. 229
3. Pub. No. 214
4. All of the above

6-74. What is the time of civil morning twilight at latitude 53°N, and longitude 59°E?

1. 0605
2. 0609
3. 0613
4. 0623